IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	Green
Serial No.:	09/389,939
Filed:	September 3, 1999
For:	FINANCIAL INSTRUMENT FILTERING SYSTEM AND METHOD THEREFOR
Examiner:	Cuff, Michael A.
Art Unit:	3627
Confirmation No.:	6068
Customer No.:	27623 Attorney Docket No.: 321.5452 USU

RESPONSE TO FINAL OFFICE ACTION

Mail Stop AF
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

This response is in reply to the final Office Action dated February 11, 2005. Claims 18-24, 26-29, 42-44, 47, 50 and 51 are pending in the application. Reconsideration of this application is respectfully requested.

The Office Action rejects claims 18-24, 26-29, 42-44, 47, 50 and 51 under 35 U.S.C 103(a) as unpatentable over Mathworks.com (December 12, 1997 Internet Publication), hereafter Mathworks, in view of U.S Patent No. 6,212,526 to Chaudhuri et al., hereafter Chaudhuri.

This rejection is traversed. In the final Office Action, the Examiner broadly alleges that Mathworks shows all of the limitations of the claims except for specifying the data filtering steps.

The allegation is respectfully traversed. The Examiner provides a brief description of Mathworks, but does not specifically point out any part of Mathworks that discloses any feature recited in the claims. The Examiner does not even apply Mathworks to any specific claim.

In fact, Mathworks merely describes a set of tools that are useful for various analyses. However, Mathworks does not even describe a searching procedure. For example, independent claims 18, 24, 42 and 47 each recite searching or search of a universe of financial instruments. Mathworks does not even mention a search of financial instruments.

The Examiner notes that the Financial Toolbox feature of Mathworks can perform many different types of financial analyses. However, the Financial Toolbox feature does not even mention searching a universe of financial instruments. The Examiner further notes that the Statistics Toolbox feature of Mathworks can support Financial Toolbox by producing a histogram frequency and observed values. Mathworks shows one figure in which a normal density curve is superimposed on a histogram. There is no discussion of using histograms in an interactive search procedure as recited in independent claims 18, 24, 42 and 47.

The Examiner admits that Mathworks does not disclose the data filtering steps recited in the claims. The Examiner concludes that based on the teaching of Chaudhuri, it would have been obvious to one of ordinary skill in the art to modify Mathworks to use Chaudhuri's system of data mining a database to efficiently provide data to Mathworks analyses.

This conclusion is erroneous. Chaudhuri in no way discloses the search procedure and filtering steps recited in independent claims 18, 24, 42 and 47.

Chaudhuri discloses a data mining system that builds a classification tree. The tree, once built, can be used as an aid in retrieving target data of search queries from the database. Chaudhuri uses an algorithm to build the classification tree without any interaction with a user or any display of results of the database scans performed to build the classification tree. Chaudhuri at column 7, lines 62-67, refers to a graphical user interface "for evaluating the database by means of the data mining engine 10", but does not describe how or in what way the database is evaluated. This is the only reference to a graphical user interface in Chaudhuri. The building of the classification tree is done solely by an algorithm without any interaction with a user.

The Examiner's commentary does not even assert that Chaudhuri's procedure for building the classification tree uses filtering steps as recited in independent claims 18, 24, 42 and 47. The Examiner makes no step by step comparison of the claims with Chaudhuri. The Examiner merely mentions that the "scheduler switches from sequential access of all records in the database to indexed (filtered) access of a subset of records within the database". The Examiner then refers to column 1, lines 42-46, for an example application and to column 6, lines 10-16, as emphasizing the use of data contained in a previous scan. The column 1 citation merely describes applications where classification of a database is useful. The column 6 citation merely states that the scheduler can optimize a next scan by choosing to index or load records into a memory from the data contained in a previous scan of the database. At column 5, lines 51-56, it is apparent when the scheduler decides to use an index scan, it prepares and maintains a set of indices for all cases associated with a corresponding node in the tree and that these indices are scanned in an index scan. Chaudhuri's index scan is a scan of indices and not a filter step. Chaudhuri's index scan does not

function like any of the filter steps of the search procedure recited in independent claims 18, 24, 42 and 47.

For example, steps (a), (c), (d), (e) and (f) of independent claim 18 recite interaction with a user. Chaudhuri does not teach any interaction with a user to build the classification tree.

The Examiner admits that Mathworks does not disclose a search procedure that performs steps (a) through (f) of independent claim 18 (or similar steps of independent claims 24, 42 and 47). Chaudhuri does not disclose the steps that Mathworks lacks. Therefore, independent claims 18, 24, 42 and 47 are unobvious over the combination of Mathworks and Chaudhuri.

The Examiner contends that the claims do not claim searching and that the claims are drawn to filtering. This contention is erroneous. For example, claim 18 at line 6 recites that the computer is configured "based on a search procedure to perform steps comprising". The Examiner seems to be ignoring the preamble of claim 18, which recites: "A method for searching a universe of financial instruments by performing a plurality of n filter passes of said universe". However the body of claim 18 incorporates this language by reference. Thus, "n filter passes" is incorporated at lines 11 and 12 that refer to "an i^{th} filter pass where i is any integer from 1 to n" and at line 15 that refers to "said filter passes". At lines 18 and 23-25, "financial instruments" incorporates "financial instruments from the preamble. These references inherently bring "searching a universe of financial instruments by performing a plurality of n filter passes of said universe" into the body of claim 18. Similar argument can be presented for independent claims 24, 42 and 47. Therefore, independent claims 18, 24, 42 and 47 do recite a method searching a universe of financial instruments and the Examiner's contention is erroneous.

The Examiner has found Mathworks and Chaudhuri and alleged obviousness. However, there is no motivation for one of ordinary skill in the art to combine Mathworks, a mathematical analysis tool, and Chaudhuri, a builder of a classification model for database searching.

The Office Action suggestion to use Chaudhuri in combination with Mathworks is improperly based on the hindsight of Applicants' disclosure. Such hindsight reconstruction of the art cannot be the basis of a rejection under 35 U.S.C. 103. The prior art itself must suggest that modification or provide the reason or motivation for making such modification. In re Laskowski, 871 F.2d 115, 117, 10 USPQ 2d 1397, 1398-1399 (CAFC, 1989). "The invention must be viewed not after the blueprint has been drawn by the inventor, but as it would have been perceived in the state of the art that existed at the time the invention was made." Sensonics Inc. v. Aerosonic Corp. 38 USPQ 2d 1551, 1554 (CAFC, 1996), citing Interconnect Planning Corp. v. Feil, 774 F. 2d 1132, 1138, 227 USPQ 543, 547 (CAFC, 1985).

There is still another reason why the rejection is erroneous. Mathworks has only one page that bears a 1997 date and that page is page 1 of the document as furnished to Applicant by the USPTO. The document is appended hereto with its cover or search tabulation page and pages marked with the numbers 1 through 12. All other pages 2-12 bear a date of 1998 in the header. Additionally, pages 3, 4, 7, 10 and 12 also bear a "copyright 1998" notice. The search results cover page refers to two 1998 dates, namely, Dec. 5, 1998 and Dec. 12, 1998, both of which are predated by Applicant's priority date of September 4, 1998. Therefore, pages 2-12 of the Mathworks document is an improper reference for the rejection of the claims of the present application. Moreover, Mathworks pages 2-12 does not constitute a reference under 35 U.S.C. 102 and must be withdrawn. Page 1 of Mathworks appears to predate the priority date of the present application, but it neither describes nor suggests that which is recited in the pending claims. That is, Mathworks page 1 merely

refers to four tool boxes and a workshop without any discussion. Page 1 does not in any way constitute any teaching of the claimed invention.

For the reasons set forth above, it is submitted that the rejection of claims 18-24, 26-29, 42-44, 47, 50 and 51 under 35 U.S.C. 103(a) is erroneous and should be withdrawn.

It is respectfully requested for the reasons set forth above that the rejection 35 U.S.C. 103(a) be withdrawn, that claims 18-24, 26-29, 42-44, 47, 50 and 51 be allowed and that this application be passed to issue.

Respectfully Submitted,

Date: 3-31-05

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			Apr 28, 1999 *	Jul 13, 2000 *	May 05, 2001	Sep 14, 2002 *	Apr 24, 2003	
			Apr 28, 1999 *	Aug 15, 2000 *	May 06, 2001	Sep 23, 2002 *	May 24, 2003 *	
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					Nov 27, 2001 *			
					Dec 15, 2001 *			

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MATLAB in:
DSP
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Finance
Other Applications

User Stories

Company Info

Job Openings

Gallery

WHAT'S NEW — NEW RELEASE HIGHLIGHTS

Control Systems Toolbox 4
Real-Time Workshop 2
Image Processing Toolbox 2
Symbolic Math Toolbox 2
Signal Processing Toolbox 4

MATLAB Overview Go

MATLAB Access

1

MATLAB

Mathematical Computation | Graphics & Visualization | Data Analysis | Algorithm Development | Simulation & Modeling | Programming & Application Development | DSP Design

MATLAB 5.0, 5.1 & 5.2 Highlights

DEMOS

User Stories

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The Language of Technical Computing

MATLAB is an integrated technical computing environment that combines numeric computation, advanced graphics and visualization, and a high-level programming language.

Whatever the objective - an algorithm, analysis, graph, report, or simulation - MATLAB gets you there. The flexible, interactive MATLAB language lets engineers and scientists express their technical ideas simply. The extensive and powerful numeric computing methods and graphics allows testing and exploring alternative ideas easily, while the integrated development environment makes it easy to produce fast, practical results.

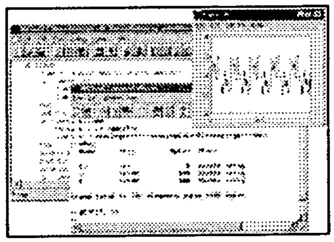
> *"For the purposes of an engineer or scientist, MATLAB has the most features and is the best developed program in its class."*
> *-IEEE Spectrum, Software Review, February 1997*

Background and Overview

The name MATLAB stands for matrix laboratory. MATLAB was originally written to provide easy access to matrix software developed by the LINPACK and EISPACK projects, which together represent the state of the art in software for matrix computation. Today MATLAB is used in a variety of application areas including signal and image processing, control system design, financial engineering, and medical research. The open architecture makes it easy to use MATLAB and companion products to explore data and create custom tools that provide early insights and competitive advantages.

The MATLAB Product Family includes tools for:

- Data analysis and visualization
- Numeric and symbolic computation
- Engineering and scientific graphics
- Modeling, simulation, and prototyping
- Programming, application development, and GUI design
- Converting MATLAB programs automatically to standalone C and C++ code



The MATLAB Command Window

What are Toolboxes?
MATLAB also features a family of application-specific solutions called toolboxes. Very important to most users of MATLAB, toolboxes are comprehensive collections of MATLAB functions (M-files) that extend the MATLAB environment in order to solve particular classes of problems. Researched and developed by experts in their fields, toolboxes let you learn, apply, and compare best-of-class techniques, allowing you to evaluate different approaches without writing the code.

Areas in which toolboxes are available include signal processing, control systems design, dynamic systems simulation, systems identification, neural networks, and others.

Extensible and Portable Design
Probably the most important feature of MATLAB is its easy extensibility. This allows you to become a contributing author too, creating your own applications. It enables you to solve many numerical problems in a fraction of the time that it would take to write a program in a language such as Fortran, C, or C++. You can also link to external software and data from MATLAB. MATLAB code and data formats are platform independent, so sharing your ideas and designs across PC, Unix, and Macintosh platforms is seamless.

▲ Top ▶ Next Topic

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Toolboxes are specialized collections of M-files (MATLAB language programs) built specifically for solving particular classes of problems.

Our Toolboxes are more than just collections of useful functions, though. They represent the efforts of some of the world's top researchers in fields such as controls, signal processing, system identification, and others.

- Chemometrics
- Communications
- Control System
- Financial Toolbox
- Frequency Domain System Identification
- Fuzzy Logic
- Higher-Order Spectral Analysis
- Image Processing
- LMI Control
- Mapping
- Model Predictive Control
- μ-Analysis and Synthesis
- NAG
- Neural Network
- Optimization
- Partial Differential Equation
- QFT Control Design
- Robust Control
- Signal Processing
- Spline
- Statistics
- Symbolic/Extended Symbolic Math
- System Identification
- Wavelet

Statistics Toolbox

Free Tech Info Kits

Powerful tools for statistical analysis and modeling.

- Key Features
- Overview
- Functions
- Examples
- Requirements

The Statistics Toolbox is an easy-to-use environment for analyzing historical data, modeling systems to predict their behavior, developing statistical algorithms, and learning and teaching statistics. Interactive GUI tools let you apply statistical methods easily and consistently, while the MATLAB language lets you easily create custom statistical methods and analyses. This combination gives you the freedom to access functions such as probability and ANOVA directly from the command line, or to use the interactive interfaces to learn and experiment with the Toolbox's built-in visualization and analysis tools.

The Statistics Toolbox contains more than 200 M-files that cover the following areas:

- Probability distributions
- Parameter estimations
- Multivariate statistics
- Linear and nonlinear modeling
- Statistical plotting
- Statistical Process Control
- Design of Experiments

> *"Ease of use is what draws me to MATLAB. The graphics are excellent and easy to produce."*
>
> **-Michael B. Miller, Washington University School of Medicine**

Key Features

- Interactive GUI tools that let you analyze data in real time
- Presentation-quality graphing tools for box plots, normal probability plots, contour plots, and more
- Modeling and surface fitting functions include:
    - Polynomial prediction with confidence intervals
    - Multiple linear regression

  - Ridge regression
  - Response surface visualization
  - Nonlinear least-squares fitting
  - Hypothesis testing functions such as one-way and two-way analysis of variance (ANOVA), one- and two-sample T-tests, and Z-tests
- Probability distribution functions
- Parameter estimates and fitting
- Principal Components Analysis (PCA)
- Statistical Process Control (SPC)
- Design Of Experiments (DOE)
- Descriptive statistics functions such as bootstrap statistics, results based on data with missing values, (NaNs), and percentile estimates
- Nonlinear model fitting and prediction
- Response surface modeling
- Interactive stepwise regression
- Curve fitting

Overview

Model Fitting Environment The toolbox is the ideal environment for non-routine model fitting. Primary capabilities include: regression analysis and diagnostics with variable selection, nonlinear modeling, probability modeling and parameter estimation, sensitivity analysis using random number generators, statistical process control, and design of experiments.

Probability Distributions The Statistics Toolbox supports a suite of 20 different probability distributions, including T, F, and Chi-square distributions. Parameter fitting functions, graphical displays of the fits, and ways to calculate better fits are provided for all distribution types.

GUI Tools Many interactive tools are provided for dynamic visualization and analysis of data. Specialized interfaces are included for response surface modeling, distribution visualization, random number generation, and contour plots.

Statistical Plots Statistical plotting commands such as `weibplot` and `randplot` allow you to perform reliability analysis or distributional fitting.

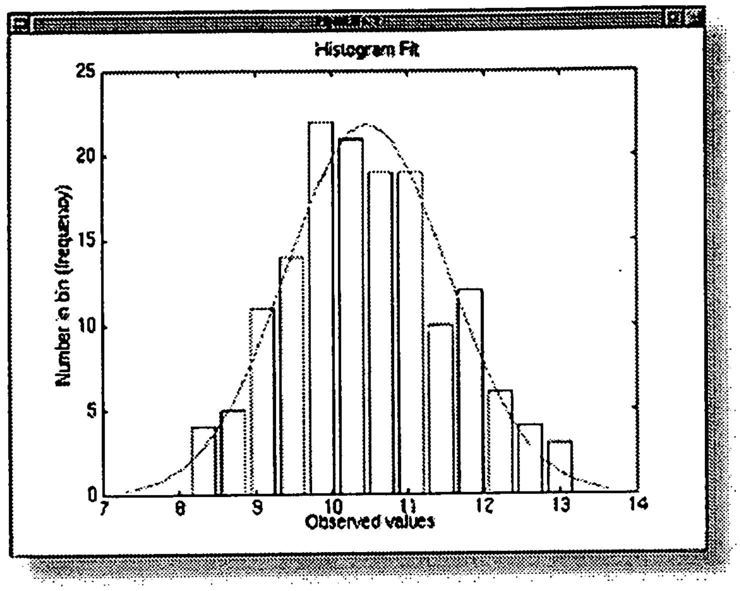
Design of Experiments (DOE) This lets you optimize a system's outputs by systematically varying its controllable inputs. The Toolbox supports D-optimal, factorial, and Hadamard designs. These techniques enable you to generate experimental designs for a wide range of process control and other applications.

Algorithm Development In conjunction with the MATLAB computing language, the toolbox gives you everything you need to develop new algorithms for statistical analysis. You can use the plotting functions in the Statistics Toolbox, or create your own using the Handle Graphics features in MATLAB.

NEW! Statistics Toolbox Functions

A full list of the Statistics Toolbox Functions are now available.

Examples



Above, the `histfit` *command superimposes a normal density curve on a histogram. The default number of bins is set to the square root of the number of elements in the data.*

Requirements

- ***Product Requirements.*** To use the Statistics Toolbox you will need MATLAB.
- ***System Requirements***
- ***Update Information***

[Product Pricing | Free Technical Kit]

Top of Page ▲

NEW VERSION

Financial Toolbox 1.1

Free Tech Info Kits

The Financial Toolbox is a robust set of functions essential to financial quantitative analysis and application development. The Toolbox provides a foundation within MATLAB for performing many types of financial tasks from simple calculations to development of full-scale distributed applications.

- Key Features
- Overview
- What's New
- Functions
- Demos
- Requirements

The Financial Toolbox is used for a wide array of applications including fixed income pricing, yield, and sensitivity analysis; advanced term structure analysis; coupon cash flow date and accrued interest analysis; and derivative pricing and sensitivity analysis. For more information see our MATLAB in Financial Engineering Web site.

Key Features

The Financial Toolbox provides advanced functionality in several areas, including:

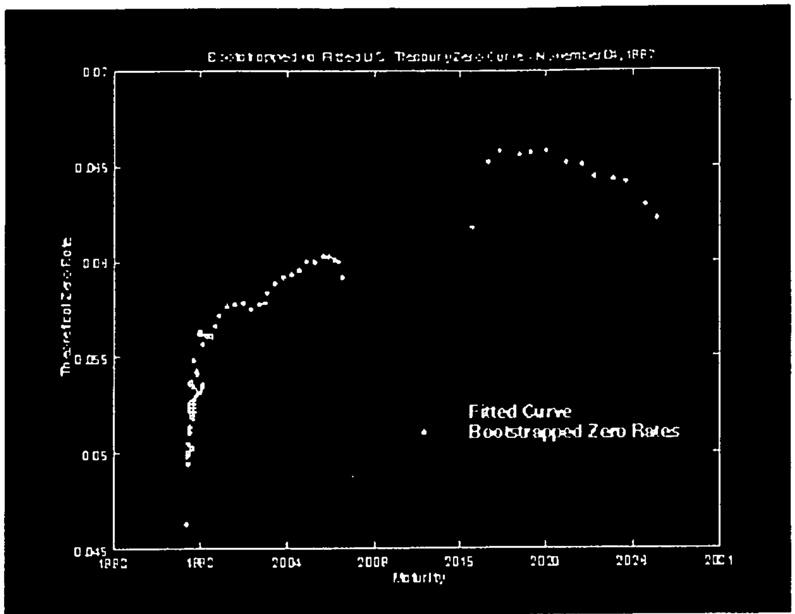
- Fixed income pricing, yield, and sensitivity calculations
- Advanced analysis on of the term structure of interest rates
- Advanced coupon cash flow date and accrued interest analysis
- Binomial lattice and Black Scholes-based derivative analysis
- Portfolio optimization and performance analysis
- Advanced financial date derivation based on major market conventions

Overview

Advanced term structure analysis. The Financial Toolbox contains an entire tool kit for advanced term structure modeling and analysis.

System Identification

Wavelet



The term structure toolkit contained in the Financial Toolbox lets you bootstrap a theoretical spot curve from U.S. Treasury market data and then convert that curve to its equivalent implied forward rate, discount, and par yield form.

Fixed income pricing, yield, and sensitivity analysis. The Financial Toolbox contains functions for computing prices, yields, and sensitivity measures for fixed income securities. The first or last period of the maturity cycle can be irregular and can differ from the interval between coupon dates. All major market conventions for bond basis and the "end of month rule" are specified within these functions.

Coupon cash flow date and accrued interest analysis for fixed income securities. Several functions are provided for precisely determining the coupon cash flow date structure and accrued interest amounts for a single fixed income security or an entire portfolio of securities.

Binomial lattice and Black Scholes-based derivative analysis. Functions based on both the Black-Scholes and binomial lattice option pricing models are provided. Functions that use the Black-Scholes framework to derive option sensitivity measures are also included.

Portfolio optimization and performance analysis. Functions are provided for determining the minimum variance asset allocation for a portfolio using an underlying Markowitz model to determine the efficient frontier. A function for deriving an exponentially-weighted covariance matrix based on asset returns is also provided.

Financial date derivation **based on** ***all major market conventions.*** Several functions are provided for deriving financial date structures *based* on differing market conventions. These include functions for:

- Identifying standard U.S. holidays
- Identifying user-specified holidays

- Finding the number of business days between dates
- Finding the first and last business days of each month
- Moving backward and forward by a specified number of days or months

What's New in Version 1.1

- Interest rate term structure suite
- Bootstrapping techniques
- Term structure smoothing function
- Utilities for converting market data to required formats
- Portfolio optimization covariance and constraint functions
- Black's option pricing model
- Fixed income/cash flow date functions

Update Information

Demos

Advanced Term Structure Analysis

NEW! Financial Toolbox Functions

A full list of the Financial Toolbox Functions is now available.

Requirements

- ***Product Requirements.*** To use the Financial Toolbox you will need the Statistics Toolbox and the Optimization Toolbox. The Simulink graphical interface is recommended for Monte Carlo and non-stochastic simulations for pricing fixed income, derivative, and equity instruments. The Spline Toolbox is also recommended for those wanting to fit curves to financial market data.
- ***System Requirements***

[Product Pricing | Free Technical Kit]

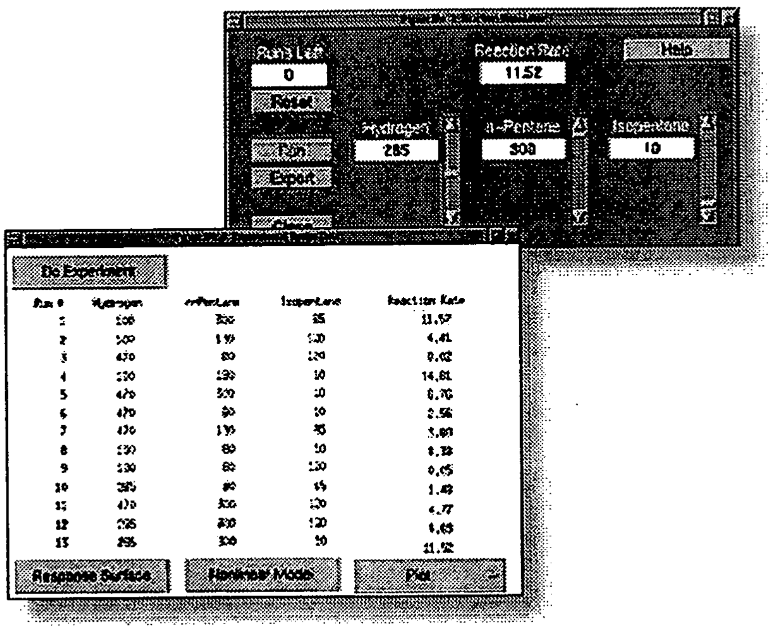
Top of Page ▲

The MATH WORKS Inc.

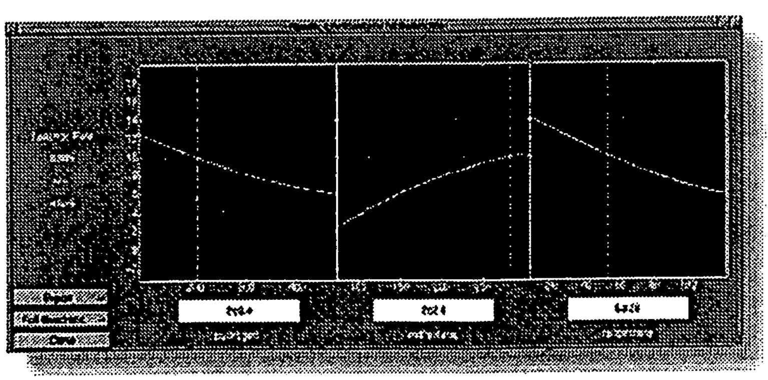
Exploring and Learning with the Statistics Toolbox GUI Tools

The Statistics Toolbox includes a number of easy-to-use displays that provide graphical views of your data and precise numeric readouts of the current function value and related descriptive statistics. User interface controls, such as buttons, sliders, and dynamic data curves, give you control over the data display.

These interactive displays allow you to explore your data, experiment with changes to inputs, and view the results of hypothetical changes — all in a single screen. This approach to statistics helps you learn about a process while giving you an intuitive feel for the behavior of the underlying statistical functions.



The Statistics Toolbox features interactive displays that let you experiment with and learn about the toolbox's built-in visualization and analysis tools. The interactive tool shown above, obtained by typing `rsmdemo`, *teaches concepts in design of experiments and regression modeling.*



Multiple input displays allow you to do multidimensional relationship analysis. Each section represents one input. The dotted cross bars can be moved with the mouse to change one parameter value, which causes all other parameters (inputs) to update simultaneously.